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***WATER SAVINGS THROUGH UTILIZATION OF
SHORT DURATION RICE VARIETIES:
NATIONAL POLICY PACKAGE, 1999-2000***

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International Resources Group Winrock International Nile Consultants**

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Report

Water Savings through Utilization of Short Duration Rice Varieties: National Policy Package, 1999-2000

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EXECUTIVE SUMMARY

This report presents the actions to be taken by the Ministry of Agriculture and Land Reclamation and the Ministry of Public Works and Water Resources in order to meet the C.6 Benchmark, which states:

The GOE (MPWWR and MALR jointly) will adopt policies for the substitution of short duration rice varieties for long duration rice varieties among private commercial growers and for changing water scheduling to achieve optimal use of water for rice production.

The verification indicator is:

Approval by the two Ministers (MPWWR and MALR) of a national policy package, including a timetable for adoption, provision of seeds, farmer training, and changes in water scheduling, for the substitution of short duration rice varieties for long duration rice varieties.

This policy package consists of two phases:

Phase I (1999). Demonstration and control areas in each of the six main rice-growing governorates:

- A. Joint selection of demonstration and control canals (January)
- B. MALR Activity
 1. Training of national rice and local village extension staff (February and March)
 2. Meetings with farmers (March)
 3. Seed distribution (March and April)
 4. Nursery establishment and transplanting (May and June)
 5. Continued extension activities during growing season (April through October)
 6. Completion of education/awareness/training package
 7. Collection of production and economic data (October, 1999)
- C. MPWWR Activity

1. Training of district engineers and supervisory personnel in water measurement and monitoring (February through May)
2. Canal maintenance
3. Water rotation change (August)
4. Data analysis (October through December)

Phase II (2000). Extension of program nationally

A. Joint evaluation of program (January)

B. MALR Activity

1. Review/disseminate information package (February and March)
2. Seed distribution (April and May)

C. MPWWR Activity

1. Disseminate water rotation information (April through June)
2. Change water rotations (August)

1. INTRODUCTION

1.1 Overview

The Agricultural Policy Program (APRP) is a four-year United States Agency for International Development (USAID) grant program involving several ministries. The Ministry of Agriculture and Land Reclamation (MALR) is the primary Egyptian governmental agency charged with support of agricultural production. The Ministry of Public Works and Water Resources (MPWWR) has the prime responsibility for management of Egypt's water resources. MALR, MPWWR and USAID, under the umbrella of the APRP, jointly designed an agricultural and water policy package, which consists of integrated policy and institutional reforms. USAID supports the Ministries' efforts through annual cash transfers based on performance in achieving identified and agreed-upon policy reform benchmarks and technical assistance.

Technical assistance for the water policy analysis activity is provided through a task order (Contract PCE-I-00-96-00002-00, Task Order 807) under the umbrella of the Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ) between USAID and a consortium headed by the International Resources Group (IRG) and Winrock International. Local technical assistance and administrative support is provided through a subcontract with Nile Consultants.

1.2 Purpose of the Report

A Memorandum of Understanding between the Arab Republic of Egypt and USAID listing mutually agreed policy reform benchmarks for the APRP Tranche III period (July 1, 1998 – June 30, 1999) was signed on September 27, 1998. Benchmark C.6, Rice Water Use Policies, states:

The GOE (MPWWR and MALR jointly) will adopt policies for the substitution of short duration rice varieties for long duration rice varieties among private commercial growers and for changing water scheduling to achieve optimal use of water for rice production.

Satisfactory achievement of the benchmark requires the accomplishment of a verification indicator, which is:

Approval by the two Ministers (MPWWR and MALR) of a national policy package, including a timetable for adoption, provision of seeds, farmer training, and changes in water scheduling, for the substitution of short duration rice varieties for long duration rice varieties.

The purpose of this report is to address the verification indicator by presenting the Plan for water savings through the national adoption of short duration varieties.

1.3 Background

As Egypt expands irrigated agriculture to new lands, the pressure on its fixed supply of water from the Nile River (High Aswan Dam releases of 55.5 billion cubic meters [bcm]) increases. In an effort to rationalize water use in existing irrigated agriculture while preserving the productivity and incomes of farm families, the Government of Egypt (GOE) has embarked on programs which encourage water savings. Two basic strategies for saving water used for crops have been explored: crop substitution and improved irrigation techniques. Rice cultivation uses the most water of any crop in Egypt – about 12 billion cubic meters of applied water of which about 7 billion is consumptively used. The potential for saving water by using rice varieties that require less water appears to be significant.

1.3.1 Short Duration Rice Varieties

The Field Crop Research Institute (FCRI) of MALR has devoted several years to developing short season varieties of rice which will allow reduced water application and consumption and ensure high productivity levels. These efforts have been quite successful. At least three varieties of rice have been produced that shorten the cultivation period from the normal 160 days (Giza 171) to 120 or 125 days (Giza 177 and Sakha 102, 103 and 104) in experimental trials. Sakha 101 and Giza 178 reduce the cultivation to 140 and 135 days, respectively. Giza 178 is more salt-tolerant than the other short duration varieties. In those same experimental trials, the short duration varieties produced yields higher than the longer duration varieties (4.0 – 5.5 tons/feddan or 9.5 – 13.0 tons/hectare). In fact, over the past three years, an increasing portion of total rice cultivation has been devoted to these short

duration varieties. In 1997, about 14% of rice grown was short duration varieties, and in 1998, about 50% was short duration varieties.

Water releases by the MPWWR for irrigating are based on required rice waterings and water rotations in canals, rather than on volumetric deliveries. Rice rotations are generally 4 days “on” and 6 days “off” (4/6), compared to a non-rice rotation of 5 days “on” and 10 days “off” (5/10). So long as short and long duration varieties are grown together, the MPWWR policy is to continue to release water on the rice rotation until all varieties have matured (no earlier than the end of September) so as not to cause harm to farmers cultivating long duration varieties. Moreover, if short season varieties are planted late in the planting season (late June), required waterings, and therefore water rotations, also extend until the end of September. If the short season varieties are planted in early May, required waterings and water rotations can be completed by the end of August. Thus, in order to shorten the period of rice rotations in the canals, rice cultivation needs to be coordinated so that only short season varieties are planted, and so that the planting (and therefore harvest) takes place over a relatively limited time.

1.3.2 Sidi Gamee Pilot Program

A pilot program was undertaken jointly by the MALR and MPWWR during the 1998 rice cultivation season to test the effects of a coordinated short season variety planting and water regime. The pilot program consisted of:

- (1) obtaining farmer commitment to grow only the short duration varieties (in this case, Giza 177 and 178, and Sakha 101, 102, 103 and 104);
- (2) coordinating the establishment of nurseries and transplanting dates among the farmers on the pilot; and
- (3) ending the water rotation for rice on August 31, one month earlier than normal.

This pilot was located on the El Sanhoor Gadidah secondary canal, with the Sidi Gamee branch canal serving as the pilot, or demonstration, canal. The El Sanhoor Gadidah canal served as the control. Private commercial farmers on the Sidi Gamee canal were provided with information about the varieties, incentives to plant those varieties including free seed, and an extension program of both information and training. A program of water

measurement and monitoring was developed to take daily flow measurements using a flow meter and continuous water level measuring by automatic recorders at the head and tail of both the pilot and control canals. A fifth recorder for the control canal was located at the pilot canal offtake. Water supplies were shifted from a rice rotation to a normal rotation at the end of August on the Sidi Gamee canal. The rice rotation continued to the end of September on the control canal, as is normal practice for winter crops.

In general, results from the pilot indicated that short duration varieties produced good yields. The measured yields from the pilot canal averaged slightly below 4 tons/feddan, while the average yields from the control canal were 3.5 tons/feddan for the short duration varieties and 3.3 tons per feddan for the long duration varieties. Statistically, the yields from the pilot area were greater than those of the control area, but short and long duration variety yields in the control area were indistinguishable. A statistically significant reduction of applied water of 1,280 cubic meters per feddan (and an estimated 755 cubic meters per feddan of consumptive use reduction) was achieved on the pilot area compared to the control area. A final report on this pilot program will be published under separate cover.

This Plan details a program of extension of the pilot program to all rice cultivation areas. Approval and adoption of the plan by the GOE (MPWWR and MALR) would represent an official change in both the water rotation policy and in philosophy of irrigation water delivery to achieve water savings.

1.4 Organization of the Report

Chapter 2 presents the Plan of Action for the year 1999 and 2000, and Chapter 3 recommends its adoption. The Appendices A and B present the timelines of Phases 1 and 2 of the Plan.

Appendix C presents the estimated levels of effort necessary to achieve the plan's objectives.

2. PLAN OF ACTION

The extension of the pilot program will include (1) an awareness/information campaign to reach involved farmers; (2) the provision of adequate supplies of short duration variety seed; (3) coordinated planting dates; and (4) early shifting from the rice water rotations (4/6) to normal rotations (5/10). The extension will require two phases. In the first phase, the program will be implemented on one canal in each of the six rice-growing Governorates in the Delta. These sites will serve as demonstration areas from which an awareness/information campaign can be developed. The second phase will entail changing all water delivery patterns to conform to coordinated short duration rice cultivation, coupled with an extensive information/education campaign to reach all rice farmers.

2.1 Phase I

The timelines and levels of effort for Phase I are found in Appendix A and Appendix C, respectively. Phase I will be completed at the end of the 1999 calendar year.

2.1.1 Canal Identification

The initial step in Phase I is for MPWWR and MALR personnel to jointly identify one pair of canals in each of the rice-growing governorates in the Delta. The selection should be based on the availability of agricultural extension programs, the potential for continuous water monitoring, and the comparability of the pair of canals with regard to agricultural production and water monitoring.

2.1.2 Agricultural Programs

The second step will involve the development of agricultural extension programs and training for both extension personnel and farmers. FCRI personnel will provide training for national rice advisors to prepare them to meet with local village extension staff and farmers as the program is implemented in February, 1999. Also in February, FCRI personnel and national rice advisors will hold introductory meetings with the village extension staff and local

farmers to present the Sidi Gamee results, to explain the benefits and advantages of the short duration varieties, and to discuss planting and transplanting dates.

During March, 1999, meetings will be held in the villages on the selected canals to arrange for seed distribution and make further nursery establishment recommendations. For Phase I, seeds will be provided by MALR at a discount of approximately 25% in order to assure quality of seeds and assure that all farmers on the demonstration canal cultivate short duration varieties. Seeds will be distributed in April, and field days will be held to further explain the necessity for coordinated planting and transplanting. Local water personnel (District engineers) will be present at the field days to answer questions and provide further information on water distribution patterns.

Nursery establishment will take place primarily in the first 15 days of May, aided by extension personnel. Transplantation of rice will occur in early June. Pest control information and training will be accomplished during July. At the end of August, irrigation will be changed from the rice rotation to normal rotation. Harvesting and agricultural economic data collection on the selected demonstration and control canals will be completed by November. Data analysis will be completed by the end of December, 1999.

Throughout this period, an education program will be developed jointly by FCRI, GreenCom, and the Water Communications Unit, with the objective of creating a set of media presentations that will inform farmers and others about the short duration variety "package," including changing water rotations. This package will be used prior to the 2000 rice growing season to prepare farmers for the conversion to short season varieties and the associated water distribution regimes.

2.1.3 Water Programs

Prior to the 1999 planting season, MPWWR personnel working on the selected canals will be informed of the short duration variety package, and trained in water measurement and monitoring. Measuring and monitoring devices will be installed on the selected demonstration and control canals, or a subset of those canals, prior to the date of nursery establishment, so as to have accurate and reliable data on water savings resulting from implementing the program. In addition, MPWWR personnel will complete any needed improvement or maintenance of the selected canals prior to nursery establishment. All

MPWWR personnel will be trained so that water delivery will be consistent with normal procedures for rice, except for the ending rotation dates. MPWWR personnel will also participate in the development of the media package.

MPWWR personnel will be responsible for developing accurate maps of the cropping patterns on both the demonstration and control canals, including indications of any long duration rice varieties being grown on the control canals. These maps will be used to compile accurate data regarding the cropping patterns for summer, nili, and winter crops.

Water delivery data will be collected through the planting of winter crops, to ensure that accurate estimates of water savings for the entire crop rotation can be made. Once the data are collected, the measured water savings will be calculated, and a final report on the water savings will be prepared.

2.2 Phase II

2.2.1 Agriculture Programs

At the beginning of Phase II, personnel from FCRI and MALR will review the information package developed during Phase I for clarity and completeness. Focus groups will be formed to review the package. The focus groups include national rice advisors, village extension agents and farmers in each of the six rice-growing governorates. MALR personnel will identify those aspects of the package, if any, which need improvement or expansion. A national campaign including broadcast and print media will be launched to inform farmers and village extension agents of the implementation of the short duration rice variety package in all rice growing areas. A Ministerial decree indicating that the GOE will provide only short duration *Japonicus* varieties will be signed prior to the seed distribution in April, 2000. Private distributors of rice seeds will be free to sell short duration varieties, and government seed will be sold at unsubsidized prices. Distribution of information to farmers will be accomplished through the village extension agents, assisted by national rice advisors.

2.2.2 Water Programs

MPWWR personnel from the Irrigation Sector, including District Engineers, will be involved in developing the information package with MALR personnel. There will also be MPWWR participation in the focus groups that will review the package. A Ministerial decree will be issued in April 2000 explaining that water will be delivered to all rice cultivators on the basis of the short season variety package; that is, water rotations for rice (4/6) will end no later than the end of August. No rice rotation will be provided after that date. Water monitoring programs may be implemented by the MPWWR, although they will not be a necessary part of Phase II.

2.2.3 Program Evaluation

The timeline and approximate level of effort for Phase II are presented in Appendix B and Appendix C, respectively. Both the timeline and the levels of effort will be re-evaluated upon the completion of Phase I. Phase II will be completed at the end of calendar year 2000, at which time an evaluation of the program will be presented to both Ministries.

MALR and MPWWR personnel, with the aid of the APRP TA team will evaluate the short season rice variety program at the end of Phase II. Problems and necessary revisions to the national program will be identified and modifications made.

3. RECOMMENDATION

It is recommended that the two Ministries agree to adopt this Plan, and assure that information regarding the impacts of the Plan on farmers and on Ministry personnel be widely disseminated before the beginning of the rice growing season in the year 2000.

Appendix A TIMELINE FOR PHASE I: 1999

<i>Activity</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
<u>Agriculture</u>												
Select Canals	XXXXX											
Train National Rice Advisors		XXXXX										
Initial Meeting with Village Extension and Farmers		XXXXX										
Village Extension, Farmer and Dist. Water Eng. Meetings			XXXXX									
Seed Distribution				XXXXX								
Village Extension and Farmer Meetings on Nursery Establishment, Transplanting					XXXXX							
Transplanting Completed						XX						

<i>Activity</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
Village Extension and Farmer Meetings on Pest and Weed Control, etc.						XX	XXXX					
Village Extension and Farmer Meetings on Harvesting and Sampling								XXXXX				
Harvesting and Sampling								XX	XXX			
Data Analysis and Reporting									XX	XXXX	XXXXX	
Preparation of Information Package for 2000 Campaign		XX	XX	XX	XX	XX		XX	XXXXX	XXXXX	XXXXX	XXXXX

<i>Activity</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
Water												
Select Canals	XXXXX											
Canal Civil Works, Maintenance	XX	XXX										
Orientation for Irrig. Eng. On Water Rotations, Monitoring, Measurement		XX										
Identify and Obtain Measurement Equipment		XX	XX									
Install Measurement Equipment			XXX	XX								
On-the-Job Training for Engineers, Aides				XX								
Cropping Pattern Data Collection					XXXXX							

<i>Activity</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
Discharge Measurement					XX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XX	
Data Analysis and Reporting											XXXXXX	XXXXXX
Preparation of Information Package for 2000 Campaign		XX	XX	XX	XX	XX		XX	XXXXXX	XXXXXX	XXXXXX	XXXXXX

Appendix B TIMELINE FOR PHASE II: 2000

<i>Activity</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
Review Information Package	XXX											
Focus Group Identification	XX											
Focus Group Evaluations of Package		XXXXX										
Package Revision			XXX									
Ministerial Decree on Rice Variety Seeds				XX								
National Media Campaign with Package				XXXX X								
Village Level Extension and Information Dissemination				XX	XX							
Rice Cultivation and Harvest					XXXXX	XXXXX	XXXXX	XXXXX	XXXXX			
Evaluation of Program										XXXXX	XXXXX	

<i>Activity</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
<u>Water</u>												
Focus Group Identification	XX											
Focus Group Evaluations of Package		XXXXXX										
Package Revision			XXX									
Ministerial Decree Regarding Water Rotations for Rice				XX								
National Media Campaign with Package				XXXX X								
District Level Information Dissemination				XX	XX							
Rice Water Rotations					XXX	XXXXXX	XXXXXX	XXXXXX				
Harvest									XXXXXX			
Evaluation of Program										XXXXXX	XXXXXX	

Appendix C LEVELS OF EFFORT

DESCRIPTION	EFFORT (Man-Days)
Phase I.	
<u>Agriculture</u>	
Labor	
Project Supervision and Research	1,964
Administrative Personnel	2,924
Lecturers/Presentations	435
General Labor	500
Material	3,483,000 LE (including 3,000,000 LE for seed)
Miscellaneous	100,000 LE
<u>Water</u>	
Labor	
Engineers	852
Project Supervision and Research	78
Administrative Personnel	480
Presentation and Training	78
General Labor	240
Material	12,000 LE
Miscellaneous	40,000 LE
Phase II.	
<u>Agriculture</u>	
Labor	
Project Supervision and Research	1,964
Administrative Personnel	2,924
Lecturers/Presentations	435
General Labor	500
Material	3,393,000 LE (including 3,000,000 LE for seed)
Miscellaneous	100,000 LE
<u>Water</u>	
Labor	
Engineers	1,270
Project Supervision and Research	114
Administrative Personnel	720
Lecturers/Presentations	111
General Labor	360
Material	18,000 LE
Miscellaneous	60,000 LE